

# Pesticide and Fertilizer Use Around the Home

---

Effects on Water Resources  
and Alternatives to Chemical Controls

---



Developed by: Montana State University Extension Water Quality Program  
and the Montana Department of Agriculture

## 2 Introduction

Did you know that use of lawn and garden chemicals such as pesticides and fertilizers by urban and small acreage (1-10 acres) landowners may have a similar or greater impact to water resources than farm or ranch operations? Most people want less weeds and insects and more plants or vegetables, fast! To achieve this we often spray, spread, supplement, and eradicate. These practices are costly, may not be necessary, and may contribute a small amount of soil, chemicals, and fertilizers to surface water through runoff or leaching into the groundwater system. On the next few pages we will discuss these resources and how chemicals applied to lawns and gardens can impair their quality. We will also help you better understand the need for appropriate chemical application, and offer some options to reduce the need of chemicals while maintaining a healthy lawn and garden.

### **Why should you care?**

Individuals, homeowners, and small landowners have a responsibility to protect and enhance the natural landscape they choose to live in. Surface and groundwater are important resources in Montana and they will become more important in the future as the state's population continues to grow. In Montana, all natural water bodies, including streams and lakes, are owned by the people. Responsible and sustainable land management practices by private citizens on small acreages and private homesteads are vital to protecting these water resources.

When you decide to apply lawn chemicals, consider whether or not it is worth the time, responsibility, and money to do so. Ask yourself: Do I really have a problem? Can I easily control the problem without the use of chemicals? If I do use chemicals, do I use the proper techniques to apply, clean-up, and store these substances? Asking these questions is not only important for your safety, but also ensures that you are being a good steward of land and water resources of Montana.

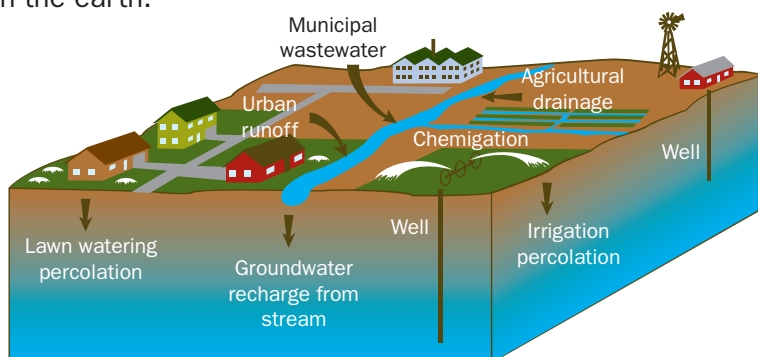
### **DID YOU KNOW?**

The average "do it yourself" homeowner spends \$75-\$100 per year on basic chemical lawn maintenance products.

## What are surface water and groundwater resources?

Water on the earth's surface is known as **surface water** and comes mostly from rain or snow melt. Surface water which is not used by plants, taken up by evaporation, or transferred by overland flow into stream systems will soak into the soil or flow between cracks in rocks, becoming **groundwater**.

Imagine you spill a cup of juice on the carpet. Juice which is not soaked up by carpet fibers will flow down until it meets a non absorbent surface, thus forcing juice to flow sideways. This is essentially the way surface water and groundwater behaves on the earth.



## How can these chemicals contaminate my water?

In the example of the spilled cup of juice, the juice is not only liquid, it contains sweeteners, organic material, and color that is transferred into the carpet through the flow of liquid. Similarly, some elements found in soil or surface water can be transmitted to the groundwater system. This transfer can potentially result in surface and groundwater contamination.

Contamination can come from various sources. In terms of small land use and private homeownership, the source can be a result of inappropriate pesticide and fertilizer use. Sometimes, contamination can occur even with appropriate use and unforeseen circumstances such as a heavy rainfall after applying lawn chemicals.

### DID YOU KNOW?

Groundwater provides 94 percent of Montana's rural domestic-water supply and 39 percent of the public water supply.

**What is a pesticide?**

A pesticide is any substance or mixture of substances intended for preventing, destroying, repelling, or mitigating any pest. The term pesticide applies to insecticides (insects), herbicides (weeds), fungicides (certain plant diseases), rodenticides (mice and other small rodents), and disinfectants (household cleaners).

**DID YOU KNOW?**

As little as 1 teaspoon of certain pesticides rinsed down a drain is enough to show up as a pollutant in local streams.

**How much is enough?**

The term “more is better” is not the case in terms of pesticide application. The chemicals in pesticide products are toxic and product labels specify appropriate quantities for very specific applications and conditions. What may seem to be a small, harmless spill or over-application could end up being harmful to people, animals, and non-target insects and plants either through direct contact, or by making its way into surface water or groundwater systems. This can also potentially contaminate drinking water supplies.

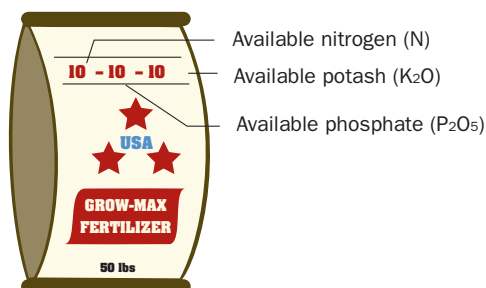
**How can pesticides in water affect me?**

All pesticides go through a conservative and protective assessment process before they are registered by EPA. The assessments also assume that people follow the label exactly and are as protective of themselves and their environment as possible. Most harmful exposure to pesticides occurs during mixing, general handling, and storage of the product. It is extremely important that the product label is read completely and that all directions are followed. Most labels specify protective clothing—such as a dust mask or a specific type of gloves—DO NOT SUBSTITUTE OR IGNORE!

Some common pesticide poisoning symptoms include difficulty breathing, sweating, itching and nausea; symptoms similar to heat exhaustion or food poisoning. The National Pesticide Information Center is the most commonly used resource for homeowners. They may be reached by e-mail or toll free by phone 7 days a week, 7:30 am to 5:30 pm, and are able to answer your questions. Their contact information is located on the last page of this booklet.

## What about fertilizers—aren't they a good thing?

Fertilizers, though excellent for plant nutrition and growth, can contaminate surface and groundwater if the ground is waterlogged or plants cannot use all of the chemical fertilizers.

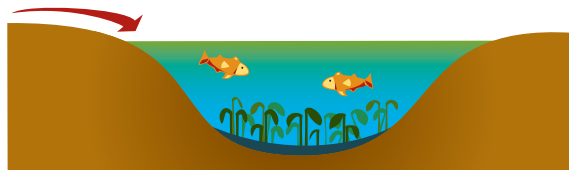


## Can fertilizers harm my family or the environment?

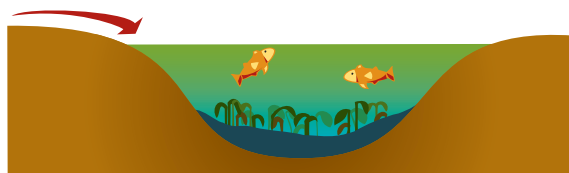
High nitrate levels in groundwater can be harmful to adults over long term exposure. Short term exposure in infants can cause methemoglobinemia, or “blue baby syndrome”, in which nitrogen in the form of nitrite affects the ability of an infant’s blood to carry oxygen, which can be fatal.

Excessive surface runoff of nutrients found in fertilizers can impair the quality of lakes and streams in a process called eutrophication, illustrated below.

Fertilizer runoff

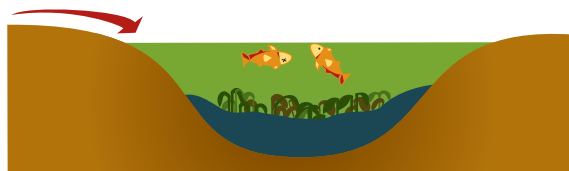


1. Algae grow fast, using up lots of oxygen and blocking sunlight



2. Aquatic plants begin to die

3. Dead matter provides food for microbes...



4. ...increasing the competition for oxygen

5. Water becomes deoxygenated - fish die

## So, what can I do?

As a private landowner it is your responsibility to understand the proper handling, application, and storage procedures for pesticides and fertilizers. Information and training is available from your local Montana State University County Extension Office.



## Best Management Practices (BMPs) for Chemical Use:

If chemical treatment is necessary, please be certain to follow these BMPs when using lawn chemicals:

- **Read the label and follow ALL application directions.**
- Make certain that all equipment is clean and working properly before mixing and applying lawn chemicals.
- Do not apply chemicals if heavy rainfall is forecasted or you plan on irrigating an area. Excess water can wash away the chemical or increase the potential for the chemical to move through the soil where it is not useful and can enter groundwater.
- **ALWAYS** store chemicals in a locked, labeled, and weather proof cabinet away from the living area of the home.

It is also important to note that the landscape and layout of your lawn can affect chemical application.

- Terracing slopes can reduce runoff of lawn chemicals and prevent erosion.
- If your property is near shallow groundwater (your private well is less than 100 ft deep), take extra precaution when applying chemicals. They have less distance to travel through the soil to the groundwater system.
- Do not mix chemicals near the wellhead. This is a direct avenue to groundwater.
- Liquid treatments will infiltrate, or soak, through the soil quicker and may travel into groundwater.

### DID YOU KNOW?

Not following the storage and application instructions on a pesticide or fertilizer label is a violation of federal law.



**What is IPM and how can I use it?**

Integrated Pest Management (IPM) is the process of monitoring and assessing your pest situation and deciding on the most effective and affordable options while minimizing risks to your health and our water resources. Consider the following IPM practices when working in the lawn and garden:

- First, decide if you really have a pest problem that merits chemical control. You may be able to save money and time by choosing not to apply chemicals if the problem is not too serious. Spend a cool morning pulling weeds or manually removing insects in the garden and yard.
- Select hardy plants that are resistant to insects and diseases, such as native species.
- Promote healthy and competitive plant communities to reduce weeds.
- During the fall, remove garden debris to prevent infection, especially if the plant has shown signs of disease.
- When you need to use a pesticide, consult with your county extension office, county weed coordinator, or a knowledgeable dealer to determine if there are reduced risk pesticides available to effectively treat weeds and pests.

**DID YOU KNOW?**

IPM requires commitment from those who adopt the practice; however, it can save money and time in managing a lawn and garden.

**What about composting instead of chemical fertilizers?**

Composting is an easy, inexpensive way to provide vital nutrients to your lawn or garden. Use of compost improves soil aeration and water retention, and converts 97% of the nitrogen in composted material into a more stable, slower released form to prevent loss and leaching into groundwater resources. Use leaves, grass clippings, needles, vegetable and fruit scraps, and other natural wastes as compost to fertilize your lawn and garden. DO NOT compost diseased plants, plant parts, or weeds. If you have horses, properly composted manure is a great natural fertilizer and barnyard cleanup method. However, do not use on food crops unless you follow proper composting procedures. For more on composting see Montana Extension Service Montguide #9203: Home Composting.

The bottom line is that individual actions can contribute to both pollution and protection of groundwater and surface water resources. Choose your pest control and fertilizer regimen carefully and do not be adverse to alternatives. For more information please check out the following resources:

**U.S. EPA, Office of Pesticide Programming and Safe Drinking Water**

<http://www.epa.gov/pesticides/>

<http://www.epa.gov/safewater/dwinfo/mt.htm>

**Montana Department of Agriculture**

<http://agr.state.mt.us/>

**Montana Department of Natural Resources and Conservation**

<http://dnrc.mt.gov/cardd/publications/TIPS%20for%20weeds.pdf>

**MSU Extension Water Quality Program**

<http://waterquality.montana.edu/docs/homeowners.shtml>

**National Pesticide Information Center**

<http://npic.orst.edu/brochure.pdf>

**Montana Extension Service**

<http://extn.msu.montana.edu/>

**Montana Master Gardener homepage**

<http://gardenguide.montana.edu/mastergardener/>

<http://www.urbanext.uiuc.edu/mglinks/pests&disease.html>

**MSU Stewardship of Small Acreages modules**

<http://animalrangeextension.montana.edu/Articles/NatResourc/mainsmallacre.htm>

**Syngenta Crop Protection, Environmental Stewardship Program**

<http://www.syngentacropprotection-us.com/enviro/>

**Text and Graphic References:**

U.S. Geological Survey: Groundwater

NCD&CS Agronomic Services Division

The U.S. Department of Agriculture (USDA), Montana State University and the Montana State University Extension Service prohibit discrimination in all of their programs and activities on the basis of race, color, national origin, gender, religion, age, disability, political beliefs, sexual orientation, and marital and family status. Issued in furtherance of cooperative extension work in agriculture and home economics, acts of May 8 and June 30, 1914, in cooperation with the U.S. Department of Agriculture, Douglas L. Steele, Vice Provost and Director, Extension Service, Montana State University, Bozeman, MT 59717

This publication was prepared in 2007 through cooperative efforts of the Montanan State University Extension Water Quality Program and the Montana Department of Agriculture.

To obtain additional copies please contact:

